Thank You

Children

Parents

Therapist

Teachers

GO SSLP Advisory Board

Prentke Romich

Alex Halloran

Alex meets Dad

Alex and Ellie

If this were my child I would....

2 year old

“The greatest obstacle to discovery is not ignorance….It is the illusion of knowledge”

-Boortin.
The Center for AAC & Autism

Mission:

- To improve public awareness of the unique qualities of the power of AAC to change the lives of non-verbal individuals with autism and other developmental disabilities by:
  - Providing specialized clinical training to health care professionals, teachers, and parents
  - Supporting clinical research
  - Supporting clients and families with education, resources, and information

Frigid Mother Syndrome

1. Talk softly
2. Look into your child’s eyes
3. Be gentle
4. Do not be so rigid
5. Get on the floor and play
6. Sabotage their environment

Lazy-eye

Presumed Causes

1. Inadequate sensory processing
2. Poor auditory processing
   a. Segmentation of speech
3. Apraxia

Ming, Brimacombe, Wagner 2007

- Reviewed studies of 154 children with ASD and found that...
  - 41% 2 – 6 year olds
  - 27% 7-18 year olds
- Showed clear evidence of oral motor and/or hand muscle apraxia

Segmentation of Speech


- Language segmentation task stimulates a connection between Broca’s area (language production) and Wernicke’s area (comprehension). When people with autism listen to a stream of syllables, however, there’s no connection between these two major language areas of the brain.
Studies on language acquisition in infants have demonstrated that statistical regularities in speech streams may guide one of the earliest steps in linguistic decoding: word segmentation (Aslin, Saffran & Newport, 1998. Aslin & Newport, 1996: Theiessen @ Saffran, 2003). In fact, the degree to which infants successfully segment has been linked to later ability in preschool children……..(Newman, Ratner, Jusczyk, & Dow 2006)

Recent FMRI study comparing segmentation ability in children with and without autism. Results found that “Unlike traditionally developing children, children with autism did not show a facility effect of increasing clues to word boundaries…….”

"In the practiced automatic movements of daily life attention is directed to the sense impression and not to the movement. So, in piano playing, the beginner may attend to his fingers but the practiced player attends only to the notes or to the melody. In speaking, writing and reading aloud, and in games and manual work, attention is always directed to the goal, never to the movement. In fact, as soon as attention is directed to the movement, this becomes less automatic and less dependable.”

Cattell, J.M.

Max Conway

Max at school
Max at home
Max verbal
Max one year later Verbal
Max talking machine 2

www.aacandautism.com
**Five Key Elements**

- Auditory Signals
- Natural Consequences
- Readiness to Learn
- Shared Focus
- Consistent and Unique Motor Patterns
- Language Connections

**Divergent Neuron**
- Single input goes to different areas

**Convergent Neurons**
- Multiple sensory inputs emerge as one experience

**Benefits of Convergence**

Once convergence takes place, senses are integrated through rules of inhibition, excitation, and speed enhancements.

**McGurk Effect**

Children with autism...showed a lower rate of the McGurk effect compared with the Asperger, Down and typical samples. These results suggest that children with autism may have unique intermodal speech perception difficulties linked to their representations of speech sounds.

**Readiness to Learn**

Some children with ASD need to be calmed in order to be in a state of readiness to interact. Other children need to have their level of alertness increased to be ready to learn. In either instance, the child must be ready at emotional and sensory levels before learning can occur. LT1 LT2

**Sensory Strategies to Ready the Child to Learn**

- Calming sensory input
  - Slow repetitive movements
  - “Heavy work”/resistive activities
  - Deep pressure

- Alerting sensory input
  - Quick, unexpected movements
  - Loud noises, music
The Inverted U-Principle

(Arousal Level)

(Duffy, 1962)

Too Much

Brandi

“Brandi is becoming spontaneous. She likes it a lot” –Jill Carpenter, Speech Therapist

Brandi 1st day
Brandi 6 months

Child Directed

Follow the child’s lead:

- Build on the child’s interests (Emily)
- Jimmy
- Carefully use barriers
- Join in with the child
- Let the child make the moves
- Use of Movement
- Mom video
- Will day 1
- 2 weeks 1 3 4 good

Shared Focus

Joint attention: the process by which one alerts another to a stimulus via nonverbal means, such as gazing or pointing. For example, one person may point to another, and then point to an object. In this case, the pointing person is trying to get the other to look at the object. The person seeing the other point responds to the gesture by looking at the object. It typically develops around one year of age in human infants and is essential to building strong social connections. Before one year of age, infants merely look at the hand of the person pointing; after developing joint attention, they look in the direction of the pointing. Chimpanzees also show some understanding of joint attention, although they primarily use it as a means to an end, rather than for pure communicative purposes.[1] Although chimps do display joint attention, the general consensus is that only humans use it in a purely altruistic way. (Wikipedia)

Consistent and Unique Motor Patterns

Aubry
Levitt's (1993) model of spoken language focuses on the cognitive processes associated with utterance generation. Levitt argued that "normally speakers have no conscious access to language encoding or articulation. For most speakers, language production is relatively effortless." (The Efficacy of Augmentative and Alternative Communication, Schlosser, 2003 p. 48).

Fitts and Posner (1967) proposed a three stage model of motor learning. The first stage is the cognitive stage in which the learner has to attend to the process of learning a motor action. This stage is marked by highly variable performance. The learner may or may not know what they are doing wrong or how to correct their performance and will need guidance to assist them. In the associative stage, he works on refining his skill and is able to detect and correct their errors. The autonomous stage is the result of a lot of practice. At this stage, the learner does not have to concentrate on the movement and can attend to other aspects of the activity.

- DJ day 1
- DJ 1 month

Automaticity

- EMG brain activity: new vs. automatic tasks
- Habitual movements become subcortical
- Cortical areas can then be put to “better use”

Automaticity: The Great Equalizer

Natural Language
- Cognitive activity: Formulation of thoughts
- Motor activity: Speech & Gesture (automatic)

AAC Language
- Cognitive activity: Formulation of thoughts
- Motor activity: Device activation (automatic???)

Auditory Signal/Feedback

La Sorte (1993), he found that synthetic speech facilitated natural speech production. He found that, “Synthetic speech can facilitate the segmenting of speech into word units since the boundaries are more clearly defined than in human speech, and stress is not an important aspect of synthesized speech.”

Pinker (1994): In speech, one “word runs into the next seamlessly; there are no silences between spoken words the way there are white spaces between written words. We simply hallucinate word boundaries when we reach the edge of a stretch of sound that matches some entry in our mental dictionary.”
According to Pinker (1994), if a person started memorizing all the possible 10-word sentences, it would take, at a rate of five seconds a sentence, a hundred trillion years (with no time for eating or sleeping).

Pinker: 2 tricks to language

“The first is the arbitrariness of the sign.” The wholly conventional pairing of a sound with meaning. The word dog does not look like a dog, walk like a dog, or woof like a dog, but it means dog……for the price of this standardized memorization, the members of a language community receive an enormous benefit….

Second trick

The second trick behind language instinct is captured in a phrase from Wihelm Von Humbodt that presaged Chomsky,

“Language makes infinite use of finite media.”

McMurray 2007

Motor Movements Affect Perception

Articulatory gestures, rather than sounds, are critical for both production and perception of speech. On neurobiological grounds, fronto-temporal circuits are thought to play a functional role in production as well as comprehension of speech. The coactivation of motor circuits and the concurrent perception of self-produced speech sounds during articulations might lead to correlated neuronal activity in motor and auditory systems, triggering long-term plastic processes based on Hebbian learning principles (D’Ausilio et al. (2009). “The Motor Somatotopy of Speech Perception.” Current Biology. 19, 1-5.)

Piano

Object, Photograph or Symbol?

Objects, photographs, picture symbols and written words can all be helpful to accompany speech and the choice will depend on the needs of the individual. Traditionally, the use of objects of reference was considered most suitable for an early developmental stage, followed by the use of photographs and only later that of symbols.

Picture symbols (line drawings which are usually accompanied by the written word) are one way of enhancing (or augmenting) the spoken word to help visual learners communicate. However, as with many aspects of development, in autism the normally developing progression from object to photo to symbol may not be appropriate indeed, sometimes the person with autism finds a symbol line drawing less confusing than a detailed photograph. People with autism tend to perceive details more powerfully than the whole.

Random Selection and Perseveration

- Hide
- May be what they are wanting to say

How to Model Vocabulary to Achieve Motor Automaticity

The goal is that the child will press the correct icon or icon sequence spontaneously and independently. However, to get to that end, you may have to help the child through the movement initially. You want to back off the amount of cuing that you are giving as soon as possible so that the child does not become cue dependent. Remember, it is a lot easier to remember how to get somewhere if you were the driver last time rather than the passenger.

- [Zack day 1](#)
- [Zack 1 year](#)
- [Zack 2 years](#)

Levels of Motor Assistance

- Hand over hand
- Point to icon
- Point to general area of icon
- Point to device
- Wait for child to activate

Zack

2-year-old with autism

- Hand over hand
- Enlarged picture
- Need two people to hold device and focus child
- Device must stay consistent in its location
- Make icons smaller after just a few hits
- Stop while successful and then go back
- After child hits the location several times, neural pathway is developed and word become automatic

How Automaticity Works

Motor Learning
- Acquisition & retention of movement for task

Repetition of a neuromotor pathway
- Eventually requires less energy
- Eventually enhances performance
- Example: touch typing

Automaticity on an AAC Device

Possible when:
- Location of icons is consistent
- Small icon set allows for immediate recognition
- Moving from one icon to the next is predictable

Not Possible when:
- Significant Navigation is required
- Continuous visual refocus & reorientation is required
Language Connections

The AAC device is a tool that allows the child to “babble” and learn about language. For example, after saying “more” to get bubbles, the child might think that pressing the key for “more” means “bubbles.” A beginning talker might make the same conclusion. However, in another instance when the child says “more” and gets more juice, the meaning of “more” is revised by the child.

As the child learns with the AAC device, he/she is learning consistent motor patterns that result in an auditory signal. Depending on the natural consequence triggered by the auditory signal, the child may modify his/her perception of what the auditory signal means.

Method/Vocabulary

LAMP is a method that crosses all platforms and products from low tech boards to dedicated and non-dedicated devices.

Any device high or low tech

Words For Life is a vocabulary that came later based on Unity. WFL is on the following platforms

- PRC/Accent (Windows)
- Saltillo/Nova WFL addition (Android)
- Lamp WFL iPad (Apple)
- Manual Boards

Access to Single Words

“Communication is based on the use of the individual words of our language. True communication is spontaneous and novel. Therefore, communication systems cannot be based significantly on pre-stored sentences. Communication requires access to a vocabulary of individual words suitable to our needs that are multiple and subject to change. These words must be selected to form the sentences that we wish to say.”

American Speech-Language-Hearing Association

ASHA’s AAC Glossary

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